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Original Research Article

A true experimental study to assess the effectiveness of *Aloe-vera* juice in relieving constipation among older adults in a selected hospital, Kolar

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ABSTRACT

Introduction: Chronic constipation becomes more common as people age, in both genders, although it becomes most common beyond age 60.*Aloe vera* is commonly used as a potent laxative and as a substance to enhance gastrointestinal motility. *Aloe vera* can be used as a natural remedy for constipation at affordable prices among old age people.

Aims and Objective : Study aimed to assess the effectiveness of aloeAloe vera juice to relieve constipation among older adults.

Materials and Methods: For the present study, a randomized control trial pretest-posttest design was adopted. Subjects consist of 60 (30 Experimental and 30 Control) older adults from R.L. Jalappa Hospital and Research Centre. The pretest was conducted using the Constipation Assessment Scale (CAS) through the Block Randomization sampling technique in both groups. A freshly prepared *Aaloe vera* juice of 100 milligrams per day was given for 20 days. Posttest was conducted in both experimental and control group after 10^{th}, and 20^{th} day. The data gathered were analyzed by descriptive and inferential statistical method using frequency, percentage, SD, Independent t test, paired t test and RMANOVA with Posthoc test.

Results: The dataset comprised 60 elderly patients. In total, the Majority of respondents 70% and 73.3% reported moderate level constipation in the experimental group & and control group during pretest. Constipation scores of no problem during posttest-I was 93.3% & 96% in experimental group during 10^{th} and 20^{th} day. Whereas in control group remains unchanged with moderate and severe constipation scores. Independent "t"test and RMANOVA found to be significant in experimental group.

Conclusion: Constipation remains a clinical problem among elderly. There is a significant relationship between effectiveness of *Aaloe vera* juice in relieving constipation among old age people. Furthermore study emphasize that, home remedy based laxatives which are affordable, available aloevera *Aloe vera* juice are effective to relive constipation among elderly.

Keywords : *Aloe vera*, Constipation, Old Age

1. Introduction

Aloe vera is widely used as a strong laxative and to promote gastrointestinal motility. *Aloe vera* treatment may be beneficial for patients with constipation-predominant irritable bowel syndrome or functional constipation.[1] It may be used as a natural remedy for constipation and eaten in a juice, gel, or tablet form. When constipated, aloe Aloe latex is mostly administered orally to help the intestines spontaneously empty.[2] As a result, osmotic laxatives and lifestyle modification stimulants are the primary therapy in the management algorithm.[3]

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Persistent constipation appears to be somewhat frequent among people in general.[4] According to estimates, between 2% and 28% of Indians experience chronic constipation; the majority of estimates range between 12% and 19%. Depending on the diagnostic criteria, its occurrence varies.[5] Chronic constipation disproportionately affects women (2:2:1), and as people age, the incidence has increased.[6]

One study found that elderly people who consume less calories and meals are also more likely to become constipated.[7] Comorbid diseases and residing in a care facility are two possible risk factors for constipation.[8]

Constipation is a common issue and challenge for the elderly. Constipation increases with age and is environment-related.[9] The incidence is 26% for women and 26% for males among community members 65 years of age or older; the greatest rate is found among individuals 84 years of age or older. It may affect as many as 80% of residents in long-term care settings.[10]

Hence, the investigator has decided to manage constipation by using home remedial measures with affordable prices among old age people with use of aloe *Aloe vera*. Because it is one of easily available medicinal aloe *Aloe vera* and had got many medicinal effects.

2. Materials & Methods

After obtaining the institutional ethics committee approval *(CTRI/2023/11/059828)*, a single-blinded randomized control trial study was conducted among the elderly in a tertiary care Hospital from September to November 2023. Volunteer inclusion criteria were adults aged≥ 60 years, seeking medical services at IPD, able to speak and understand Kannada or English, and accessible for follow-up throughout the study period by providing written consent. Participant recruitment of older adult's aged ≥60 years who are seeking medical services at R.LJ. Hospital and Research Centre, Tamaka, Kolar. (n=30) in the Experimental group and Control group (n=30), were recruited by using a Block randomization technique. The experimental group was given aloevera *Aloe vera* juice whereas the Control group received Routine care. Geriatric clients with co-morbid conditions of cardiovascular disorders and Diabetes were excluded. Participant information sheets and written consent forms were given to older adults which were translated in the regional language upon returning the consent forms, participants were invited to attend the study for one month. A sample size of 60 participants was chosen in line with previous sample size recommendations of feasibility studies.

2.1. Setting of the study

Tertiary Care hospital, at R.L. Jalappa Hospital and Research Centre, Tamaka, Kolar.

2.2. Sample size

derived by employing the Med. Calc statistical software assessed the difference between the two means as 14.2 and the SD or variance of 22.7 with the effect size of 0.2, with a 80% power of the study and a predetermined significance level of 95% (CI) with a two-tailed test and 5% absolute precision alpha error (d) and assuming 10% to be an attrition rate the estimated sample size was around 25 in each group. If 10% of the sample's dropouts were taken into account, the estimated sample size was around 30 in each group

Considering the *Cochran's formula*

$$n = \frac{2(Z\alpha + Z\,1-\beta)2\,\sigma 2}{d2}$$

1. Zα= 95% Confidence Interval
   Z (1-β) = Power of the study as 80%
2. σ2 Average variance estimation
   d = Effect size.

2.3. Sampling technique

Block randomization where wards have been categorized using Rraosoftware into blocks of 4x4 and the blocks were classified based on Block A as experimental group & Block B as control group.

2.4. Data collection tools

The tool was prepared based on the research problem, objectives of the study stated were assessed by using standardized Constipation Assessment Scale (CAS).[11]

Section-I: Proforma on Sociodemographic variables: age, gender, marital status, Educational qualification, Type of family, Co-morbidities, Health checkups undergone, and Bio physiological parameters were assessed such as Nutritional status, Vision, hearing acuity, Sleep pattern, Bowel & Bladder pattern, Physical activity per day, were recorded to provide participants' baseline characteristics. It is shown in the Table 1.

Section II: McMillan and Williams (1989) Standardized Eight item "Constipation Assessment Scale" used on old age people who have constipation. represented in the Tables 2, 3 and 4.

2.5. Intervention

Add 5ml-10ml of aloe *Aloevera* gel of 100 milligrams per day and Mix with 100 ml of water. Each day, 2 inch portions of aloe *Aloe vera* gel along with 1 cup of water to a blender were added. Blend only for 30 to 60 seconds until the aloe *Aloe vera* gel is fully crushed. Each day fresh juice is prepared and served to experimental group till 20 days and posttest assessed on 10^{th} and 20^{th} day.[12–15] RMANOVA Performed to assess the effectiveness of aloevera juice represented in Figure 1.

Data analysis Methods	Type of Statistics	Purposes
Descriptive Statistics	Frequency, Percentage, Mean, SD	Participants socio-demographic characteristics
Inferential Statistics	Paired 't' test	Compare the outcome variables before and after intervention within the group
	Independent 't' test	Compare the outcome variables before and after Intervention between the groups
	Repeated Measures of ANOVA	Assess differences in outcome over time.
	Chi-square	Find an association of selected socio-demographic variables with outcome variables

Table 1: Distribution of the geriatric clients of the Experimental and Control groups based on their socio-demographic characteristics

Sl.no	Demographic Variables	Category	Study groups f (%) Experimental	Control	df	χ^2 & (p value)
1.	Age (in Years)	60-70	27 (90)	20 (66.6)	2	Fisher exact test 0.0575. NS p > .05
		71-80	3 (10)	10 (33.3)		
2.	Gender	Male	17 (56.6)	18 (60)	1	χ^2= 0.068 (.793) NS p > .05.
		Female	13 (43.3)	12 (40)		
3.	Educational status	Formal education	16(53.3)	17 (56.6)	1	χ^2= 0.078 (.551) NS p > .05
		No formal education	14 (46.6)	13 (43.3)		
4.	Religion	Hindu	24 (80)	23(76.6)	1	χ^2=0.098 (.754) NS p > .05.
		Muslim	6 (20)	7 (23.3)		
5.	Marital Status	Married	22 (73.3)	24 (80)	1	χ^2=0.372(.541) NS p > .05.
		Widowed/widower	8(26.6)	6(20)		
6.	Place of Residence	Rural	23 (76.6)	22 (73.3)	1	χ^2= 0.088(.765) NS p > .05.
		Semi-urban/ Urban	7 (23.3)	8 (26.6)		
7.	Socio-economic Status	APL	6(20)	5(16.6)	1	χ^2= 0.111 (.738) NS p > .05
		BPL	24(80)	25 (83.3)		
8.	Type of Family	Nuclear Family	26 (86.6)	23 (76.6)	1	χ^2=1.00(.316) NS p > .05.
		Joint Family	4 (13.3)	7 (23.3)		
9.	Nutritional Status	Under-weight	19 (63.3)	18 (60)	2	χ^2=0.451 (.798) NS p > .05.
		Normal weight	6 (20)	5 (16.6)		
		Overweight / Obese	5 (16.6)	7 (23.3)		
10	Sleeping Pattern	Normal /Adequate	21 (70)	22 (73.3)	1	χ^2=0.082 (.774) NS p > .05
		Disturbed/Inadequate	9 (30)	8 (26.6)		
11	Bowel	Regular	5 (16.6)	9 (30)	1	χ^2=1.490(.222) NS p > .05
		Irregular	25 (83.3)	21 (70)		
12	Bladder	Normal	25 (83.3)	24 (80)	1	χ^2= 0.111(.738) NS p > .05.
		Urinary Incontinence	5(16.6)	6 (20)		
13	Physical Activity Performed Per day	Not Involved	17 (56.6)	12 (40)	1	χ^2=1.668(.196) NS p > .05
		Low	13 (43.3)	18 (60)		

Data presentation The data of both study groups are expressed as frequency (f) and percentage in parenthesis.

Study groups: Experimental group-geriatrics who underwent Multimodal Intervention regarding Health promotion, Control group- geriatrics who did not undergo Multimodal Intervention.

Homogeneity test The Chi-square test was used for comparison of the demographic variables of the geriatric clients of the Experimental and control groups. Level of significance – $p<0.05$ was considered significant, $p>0.05$ was considered non-significant.

Table 2: Frequency and percentage distribution of overall pre-test and post-test level scores of the Geriatric clients in experimental and control groups. (n=30+30)

Sl. no	Severity of constipation	Score range	Experimental group f (%)			Control group f (%)		
			Pretest	Posttest-1	Posttest-2	Pretest	Posttest-1	Posttest-2
1.	No Problem	0-5	8 (26.6)	28(93.3)	29(96.6)	3 (10)	2 (6.6)	1(3.3)
2.	Some Problem	6-10	21(70)	2 (6.6)	1 (3.3)	22(73.3)	20(73.3)	27(90)
3.	Severe Problem	11-16	1(3.3)	0(0)	0(0)	5(16.6)	8(16.6)	2(6.6)
		Total	**30**	**30**	**30**	**30**	**30**	**30**

Table 3: Distribution of m constipation score Mean, SD, of Constipation assessment scores of older adults by comparing the pretest and posttest scores between the groups Independentusing Independent t test between the groups during pretest and post-test.

Sl.no	Severity of constipation at time of test	Experimental group Mean ± SD	Control group	MD	Independent 't' Value	p-Value & Inference
1.	Pretest	7.55 ±1.94	8.44 ± 1.58	5.05	6.88	.212 NS
2.	Posttest 1	2.50 ±0.75	9.62± 2.13	1.18	1.30	<0.001**SS
3.	Posttest 2	2.24±0.69	10.01± 2.24	7.77	1.21	<0.001** SS

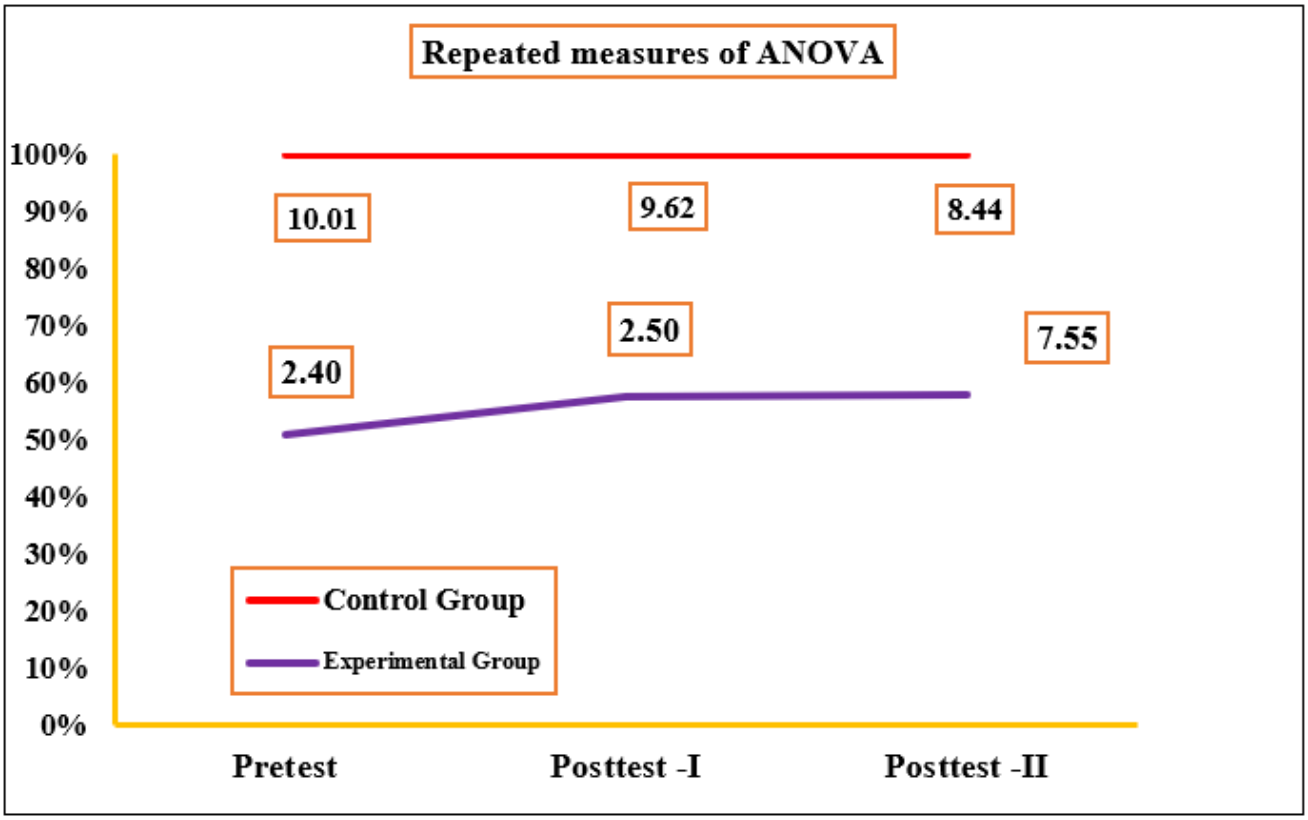

Figure 1: Depicts the line diagram representing the mean scores of constipation assessment during pretest and posttest.

Table 4: Association between pretest scores among geriatric clients and theselected socio-demographic variables. (n=30+30)

Sl.no	Demographic Variables	Experimental			Control Group		
		Below Median (<8)	Above Median (>8)	χ^2 &p value	Poor<18	M.P(>26)	χ^2 &p value
1.	**Age**						
a. b.	60-70 years 71-80 years	7 7	10 6	$\chi^{2=}$0.475(.490) NS p > .05	8 6	9 7	$\chi^{2=}$0.002 (.960.) NS p > .05.
2.	**Gender**						
a.	Male	7	8	$\chi^{2=}$0.135(.7125) NS	9	6	$\chi^{2=}$ 0.002 (.960.) NS p >
b.	Female	6	9	p > .05	8	6	.05.
3	**Educational status**						
a.	Formal education	6	10	$\chi^{2=}$0.475 (.490) NS	9	8	$\chi^{2=}$ 0.002 (.960.)
b.	No formal education	7	7	p >.05.	7	6	NS p > .05.
04	**Religion**						
a.	Hindu	9	10	$\chi^{2=}$0.002(.960) SS p > .05.	10	9	$\chi^{2=}$ 0.143 (.704.) NS p >
	Other religion	5	6		5	6	.05.
05	**Marital status**						
a.	Married	10	5	$\chi^{2=}$0.143 (.704) NS	7	8	$\chi^{2=}$1.221 (.269.)
b.	Widower/ widow	9	6	p > .05.	10	5	NS p > .05.
06	**Place of Residence**						
a.	Rural	12	6	$\chi^{2=}$1.832(.175.)	8	6	$\chi^{2=}$ 0.535 (.464.)
b.	Semi-urban	6	6	NS p > .05.	7	9	NS p > .05.
07	**Socioeconomic status**						
a.	APL	9	5	$\chi^{2=}$0.010.(.919.) NS	8	7	$\chi^{2=}$ 0.133. (.715.) NS p >
b.	BPL	10	6	p > .05.	7	8	.05.
08	**Type of family**						
a.	Nuclear Family	8	6	$\chi^{2=}$0.153.(.695.)	12	5	$\chi^{2=}$ 3.096. (.078.) NS p >
b.	Joint Family	8	8	NS p > .05.	5	8	.05.
09	**Nutritional status**						
a.	Underweight/obese	6	6	$\chi^{2=}$0.833.(.361.)	12	5	$\chi^{2=}$0.271.(.602.) NS
b.	Normal weight	6	12	NS p > .05.	8	5	p > .05
10	**Sleep Pattern**						
a.	Normal/Adequate	9	7	$\chi^{2=}$0.535. (.464.) NS	9	7	$\chi^{2=}$0.002.(.960.) NS
b.	Disturbed/Inadequate	6	8	p > .05.	8	6	p > .05.
11.	**Bowel**						
a.	Regular	5	10	$\chi^{2=}$0.143.(.704.) NS	10	6	$\chi^{2=}$ 2.142.
b.	Irregular	6	9	p > .05.	5	9	(.143.) NS p >
12.	**Bladder**						.05.
a.	Normal	9	8	$\chi^{2=}$0.135.(.712.) NS	9	8	$\chi^{2=}$0.002.(.960.) NS
b.	Urinary Incontinence	6	7	p > .05	7	6	p > .05.
13.	**Physical activities performed per day**						
a.	Not involved	6	10	$\chi^{2=}$1.157.(.281.) NS p > .05.	12	6	$\chi^{2=}$2.424.(.119.)
b.	Low	8	6		5	8	NS p > .05.
14.	**If you fall sick, do you prefer to go**						
a.	Hospital Treatment	9	6	$\chi^{2=}$0.135.(.712.)NS	11	6	$\chi^{2=}$1.032.(.309.)
b.	With medicines	8	7	p > .05.	6	7	NS p > .05.
15.	**Source of information**						
a.	Mass Media	9	7	$\chi^{2=}$0.001.(.960.) SS p > .05.	9	7	$\chi^{2=}$ 0.002(.960). NS p > .05.

3. Results

Table 2 depicts the frequency and percentage distribution of constipation assessment among older adults during pretest and posttest, with significant improvements after the intervention.

Table 3 depicts the mean scores of constipation assessmentamong older adults during pretest and posttest, with significant improvements after the intervention.

4. Discussion

It was feasible and safe to deliver a *Aloe vera* juice Intervention among geriatric clients in health care and community settings.[16] The intervention was acceptable to Geriatric clients, Caretakers and it can be developed as a protocol to improve health promotion outcome measures among the elderly.[17] A key to success was the availability &medicinal effects of *Aaloe vera* juice to improve their Quality of Life and confidence to engage with the home remedial measures.[18] This study adds to a growing body of evidence that suggests volunteers can successfully provide a intervention and take on more direct roles in supporting older individuals.[19]

A systematic review of 21 studies found evidence suggesting that *Aloe vera* is essential to improve the bowel pattern and improve health outcomes of community-dwelling older adults including severe constipation, Nutritional status[20] On the initial day of recruitment, the participants were given Pretest, followed by an *Aloe vera* juice Intervention focusing on Constipation assessment. Posttest 1& and posttest 2 on the 10^{th} , 20^{th} day, which showed a greater significant improvement in relief of constipation scores among geriatric clients.[21] Similarly, a range of studies emphasized physical and nutritional aspects in this study holistic comprehensive health promotion measures required for the elderly have been focused.[22]

LeiA systematic review of *Aaloe vera* and its effectiveness was conducted to synthesize existing research on the relationship between older adults' health and functioning.[23] A systematic search was conducted of electronic databases (MEDLINE, EMBASE, Biosis, and the Cochrane Library). The study highlighted there are promising results, clinical effectiveness of oral a *Aloe vera* to relieve constipation among geriatric.[24]

5. Conclusion

Based on the study findings, *Aloe vera* is proven to be effective to relieve constipation among older adults. This study demonstrated that it was feasible and safe to deliver a *Aloe ver*a juice for community-dwelling older adults both in hospital and community settings.[25] The geriatric population was found to be the biggest beneficiary of *Aloe vera* juice intervention strategies as home remedial measures with medicinal effects.[26]

5.1. Limitations and scope

The study was conducted among older adults between 60-75 years age group. It can be conducted in community settings. Geriatric population was the biggest beneficiaries. Further research is needed to better understand factors that influence participants' adherence to intervention strategies to promote the healthy aging.[27]

5.2. Nursing implications

1. *Nursing practice:* Nursing professionals working in the hospital as well as in the community setup should know how to assess the risk of constipation.
2. *Nursing education:* abundant opportunities to educate the elderly about healthy life styles and risk factors of constipation.
3. *Nursing administration:* manage the patient care and delivery of specific nursing services within the health care agency.[28]
4. *Nursing research:*Nursing research is urgently needed to improve the health with home remedial measures which are proven to be effective.[29][(30])

6. Recommendations of the Study

A similar study can be replicated on a large sample in different types of setting.

7. Source of Funding

None.

8. Conflict of Interest

None.

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